



**CITY OF HOUSTON  
FIRE PREVENTION BUREAU  
HOUSTON FIRE DEPARTMENT**



**LIFE SAFETY BUREAU (LSB) STANDARD 01**

**INSTALLATION AND MAINTENANCE OF  
PORTABLE FIRE EXTINGUISHERS**

**SUPERCEDES: HFD STANDARD 10-2 Rev. 1 (12/09/00)**

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# LSB STANDARD 01

## INSTALLATION AND MAINTENANCE OF PORTABLE FIRE EXTINGUISHERS

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# LSB STANDARD 01

## INSTALLATION AND MAINTENANCE OF PORTABLE FIRE EXTINGUISHERS

### SECTION 1 --- GENERAL

#### 1.1 Scope.

Listed portable fire extinguishers shall be installed in occupancies and locations as set forth in the City of Houston *Fire Code* and this standard.

When areas are not covered in this standard, listed portable fire extinguishers shall be in accordance with NFPA 10.

The requirements given herein are **MINIMUM**. Listed portable extinguishers are intended as a **first line of defense** to cope with fires of limited size. Listed portable fire extinguishers are **needed even if** the property is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment.

#### 1.2 Purpose.

This standard is for the use and guidance of persons charged with selecting, purchasing, installing, approving, and maintaining listed portable fire extinguishing equipment.

### SECTION 2 ---DEFINITIONS.

#### 2.1 Class A Rated Fire Extinguisher.

Used for fires in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.

#### 2.2 Class B Rated Fire Extinguisher.

Used for fires in flammable liquids, oils, greases, tars, oil-base paints, lacquers, and flammable gases.

#### 2.3 Class C Rated Fire Extinguisher.

Used for fires that involve energized electrical equipment where the electrical nonconductivity of the extinguishing media is of importance. (When electrical equipment is de-energized, extinguishers for Class A or B fires may be used safely).

#### 2.4 Class D Rated Fire Extinguisher.

Used for fires in combustible metals, such as magnesium, titanium, zirconium, sodium, lithium, and potassium.

#### 2.5 Type “K” Fire Extinguisher.

Used for fires involving cooking media (grease, fats and oils) in commercial cooking appliances.

**2.6 Listed portable fire extinguishing equipment.** All portable fire extinguishing equipment shall be listed for intended use.

#### 2.7 Occupancy.

The purpose for which a building or part thereof is used or intended to be used. See Appendix D.

## **SECTION 3 --- GENERAL REQUIREMENTS**

### **3.1 Annual Maintenance.**

All fire extinguishers shall have a current annual inspection tag by an approved licensed fire protection equipment company. All servicing, testing, maintenance and tagging of listed portable fire extinguishers shall be conducted annually by qualified personnel in accordance with LSB Standard 02, "Inspection and Testing of Fire Protection and Life-Safety Equipment".

**Exception:** Listed portable fire extinguishers that can not be serviced (disposable) or listed fire extinguishers that may be service only at the manufacturer.

### **3.2 Operable condition.**

Portable fire extinguishers shall be maintained in a fully charged and operable condition, and kept in their designated places at all times when they are not being used.

### **3.3 Conspicuously located.**

Portable fire extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. Preferably they shall be located along normal unobstructed paths of travel, including exits from areas.

### **3.4 Locked Cabinets.**

Cabinets housing portable fire extinguishers shall not be locked.

**Exception:** Where extinguishers are subject to malicious use, locked cabinets may be used provided they include means of emergency access.

### **3.5 Obstructions.**

Portable fire extinguishers shall not be obstructed or obscured from view.

**Exception:** In large rooms, and in certain locations where visual obstruction cannot be completely avoided, means shall be provided to indicate the locations of the fire extinguishers.

### **3.6 Installation.**

Portable fire extinguishers shall be installed on the hangers or in the brackets supplied, mounted in cabinets, or set on shelves, unless the extinguisher is of the wheeled type.

### **3.7 Physical damage.**

Portable fire extinguishers installed under conditions where they are subject to physical damage shall be protected from impact.

### **3.8 Mounting.**

Portable fire extinguishers having a gross weight not exceeding 40 pounds shall be installed so that the top of the extinguisher is not more than 5 feet above the floor. Extinguishers having a gross weight greater than 40 pounds (except wheeled types) shall be so installed that the top of the extinguisher is not more than 3 ½ feet above the floor. In no case shall the clearance between the bottom of the extinguisher and the floor be less than 4 inches.

### **3.9 Marking.**

Portable fire extinguishers mounted in cabinets or wall recesses or set on shelves shall be placed in a manner such that the extinguisher operating instructions face outward. The location of such extinguishers shall be marked conspicuously.

## SECTION 4 -----SIZE AND PLACEMENT OF PORTABLE FIRE EXTINGUISHERS

### 4.1 Minimum rating and placement.

The minimum rated listed portable fire extinguisher for any type occupancy, area or location shall be one 2-A, 10-B:C portable fire extinguisher for every 6000 square feet or fraction thereof. (Example – 6500 square feet – two portable fire extinguishers will be required).

The maximum travel distance to a Class A rated portable fire extinguisher shall be 75 feet by an unobstructed path of travel. The maximum travel distance to a Class B rated portable fire extinguisher shall be 50 feet by an unobstructed path of travel.

Upon inspection of certain occupancies, hazardous operations, or locations, the rating of a portable fire extinguisher and the travel distance may be increased or decreased by the code official per Appendix A, B, C, and D. Where requirements of this standard which are found to be in conflict with state and federal requirements the more restrictive shall apply.

#### 4.1.1 Substituting portable fire extinguishers.

One 2½-gallon water listed portable fire extinguisher may replace the requirement of one Class 2-A rated listed portable fire extinguisher for existing extinguishers. When 2½-gallon water portable fire extinguishers are in need of replacement, they shall be replaced with one 2-A, 10-B:C portable fire extinguisher only.

**Exception:** In areas where water is needed for deep penetration such as woodworking and sawdust areas.

Two 2-A rated portable fire extinguishers may replace the requirement of one 4-A rated portable fire extinguisher provided the minimum required travel distance is maintained and the minimum required floor area is covered as per Appendix B and C.

One 4-A rated portable fire extinguisher may replace the requirement of two 2-A rated portable fire extinguishers provided the minimum required travel distance to a fire extinguisher is maintained and the minimum required floor area is covered as per Appendix B and C.

One 40-B rated portable fire extinguisher may replace the requirement of two 20-B rated portable fire extinguishers provided the minimum required travel distance to a fire extinguisher is maintained and the minimum required floor area is covered as per Appendix B and C.

#### **Exceptions:**

1. Two 1-A rated portable fire extinguishers shall not substitute for a 2-A rated portable fire extinguisher.
2. Two portable fire extinguishers of lower B ratings shall not be used to fulfill the protection requirements when a higher B rated portable fire extinguisher is required. (Example - two 20-B rated portable fire extinguishers shall not replace the requirement of a 40-B rated portable fire extinguisher).
3. In sensitive areas such as telephone rooms, electrical rooms and computer rooms, fire extinguishers such as Clean Agents and CO<sub>2</sub> of the same required rating may substitute for a dry chemical fire extinguisher.

## **4.2 Occupancy Group requirements.**

Portable fire extinguishers shall be installed in all occupancies. See Appendix D for Occupancy Group Classifications.

### **4.2.1 Assemblies –Group A Occupancies (occupant load more than 50).**

Assemblies shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Assemblies with stages shall have a minimum rated 2-A, 10-B:C fire extinguisher mounted on each side of the stage.

### **4.2.2 Businesses – Group B Occupancies.**

Business offices and professional services shall be classified as **light hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 6000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Business with eating and dining (occupant load less than 50), small businesses not classified as H Occupancies, shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Business labs, print shops, using flammable and combustible liquids (not classified as Group H occupancies as per Appendix D) shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 20-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 50 feet, by an unobstructed path of travel, from a portable fire extinguisher.

### **4.2.3 Educational – Group E Occupancies.**

Educational offices and classrooms shall be classified as **light hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 6000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Educational labs and shops shall be classified as **high hazard**. At least one portable fire extinguisher with a minimum rating of 2-A, 40-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 30 feet, by an unobstructed path of travel, from a portable fire extinguisher

Day Cares facilities shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

#### 4.2.4 Factory and Industrial – Group F Occupancies.

Factory and industrial occupancies with the use and manufacturing of combustible commodities shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Factory and industrial occupancies with the use and manufacturing of noncombustible commodities shall be classified as **light hazards**. At least one portable fire extinguisher with a minimum rating of 2-A:10-B:C shall be provided for each 6000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Factory and industrial occupancies with the use of flammable and combustible liquids (not classified as Group H occupancies as per Appendix D) shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 20-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 50 feet, by an unobstructed path of travel, from an extinguisher.

#### 4.2.5 Hazardous – Group H Occupancies.

Hazardous occupancies shall be classified as **high hazard**. At least one portable fire extinguisher with a minimum rating of 4-A, 40-B:C shall be provided for each 4000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located so that no point in the building is located more than 30 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Repair garages classified as **high hazard occupancy** shall have at least one portable fire extinguisher with a minimum rating of 2A, 40-B:C provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 30 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Woodworking classified as **high hazard occupancy** shall have at least one portable fire extinguisher with a minimum rating of 4-A, provided for each 1000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located so that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher. Wood working classified as a hazardous occupancy involving flammable and combustible liquids shall have at least one portable fire extinguisher with a minimum rating of 4-A, 40-B:C provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 30 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Warehouses classified as **high hazard occupancy** shall have at least one portable fire extinguisher with a minimum rating of 4-A, 40-B:C provided for each 4000 square feet of floor space, or fraction thereof. Portable fire extinguishers shall be so located so that no point in the building is located more than 30 feet, by an unobstructed path of travel, from a portable fire extinguisher.

#### 4.2.6 Institutional – Group I Occupancies.

Institutional occupancies shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.



Institutional maintenance shops and labs using flammable and combustible liquids (not classified as Group H occupancies as per Appendix D) shall be classified as **ordinary hazard**. At least one portable fire extinguisher with a minimum rating of 2-A, 20-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 50 feet, by an unobstructed path of travel, from a portable fire extinguisher.

#### **4.2.7 Mercantile – Group M Occupancies.**

Mercantile shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Group M motor vehicle service stations dispensing fuel shall be classified as **ordinary hazards**. At least two portable fire extinguishers with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 50 feet, by an unobstructed path of travel, from a portable fire extinguisher.

#### **4.2.8 Residential – Group R Occupancies.**

Group R - Residential occupancies shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

**EXCEPTION:** 1) R-2 Apartment occupancies shall be provided with at least one portable fire extinguisher. Such extinguisher shall have a gauge showing the charge and a minimum rating of 1-A, 10-B:C. A fire extinguisher shall be provided for and properly mounted within each occupied apartment unit. Location and placement of the fire extinguisher shall be mounted in accordance with the manufactures guidelines or Section 3.8, near the kitchen entryway, accessible and no closer than 5 feet from the cooking appliance. The fire extinguisher may be mounted within an unlocked pantry or cabinet. Fire extinguishers shall comply with Section 3.1 for annual maintenance and tagging. Fire extinguishers that are not serviceable should be visually inspected at least monthly for loss of pressure (as indicated on the extinguisher's gauge) or for other damage to the fire extinguisher that might affect its performance.

2) R-2 Apartment (Garden-Type) properties equipped with automatic fire protection sprinkler systems may also exclude the fire extinguisher in each apartment unit.

R-2 Residential occupancy offices, game rooms, physical fitness areas, storage rooms, maintenance shops, boiler rooms, laundry facilities, mail rooms, club houses, commons, and public assembly areas shall be classified as ordinary hazards. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the room or area is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

#### **4.2.9 Storage – Group S Occupancies.**

**Moderate-hazard storage, Group S-1** occupancies with combustible storage not classified as H occupancy, shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction there of. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

**Low-hazard storage, Group S-2** occupancies with noncombustible storage shall be classified as **light hazard**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 6000 square feet of floor space, or fraction thereof. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Group S-1 Repair garages (limited to the exchange of parts) shall be classified as **ordinary occupancies**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction thereof. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Group S-2 open parking garages shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 10-B:C shall be provided for each 3000 square feet of floor space, or fraction thereof. Portable fire extinguishers shall be so located that no point in the building is located more than 75 feet, by an unobstructed path of travel, from a portable fire extinguisher.

Group S-1 aircraft hangars (limited to exchange of parts) shall be classified as **ordinary hazards**. At least one portable fire extinguisher with a minimum rating of 2-A, 20-B:C shall be provided for each 3000 square feet of floor space, or fraction thereof. Portable fire extinguishers shall be so located that no point in the building is located more than 50 feet, by an unobstructed path of travel, from a portable fire extinguisher.

### **4.3 General area requirements.**

#### **4.3.1 Commercial cooking operations.**

A listed Type “K” portable fire extinguisher shall be provided where cooking equipment involves the use of vegetable or animal oils and fats for deep frying. The fire extinguisher shall be installed within 30 feet of commercial food heat-processing equipment, as measured along an unobstructed path of travel.

#### **4.3.2 Parade Floats.**

Motorized parade floats and towing apparatus shall be provided with a minimum 2-A, 10-B:C portable fire extinguisher readily accessible to the operator.

#### **4.3.3 Asphalt Kettles.**

A minimum 40-B:C-rated portable fire extinguisher shall be located within 25 feet of each asphalt kettle when the heat source is operating. A minimum 40-B:C-rated portable fire extinguisher shall also be located on roofs during asphalt coating operations. Also see Houston Fire Department LSB Standard 11, “Roofing Operations”.

#### **4.3.4 Powered Industrial Trucks.**

Vehicle fire extinguishers shall be provided for each liquid-fuel or LP-gas powered industrial truck and be of a minimum rating of 10-B:C.

#### **4.3.5 Battery Charging.**

Battery-charging areas shall be provided with a fire extinguisher having a minimum rating of 4-A, 20-B:C within 20 feet of the battery charger.

#### **4.3.6 Airport-towing vehicles.**

Vehicles used for towing aircraft shall be equipped with at least one listed fire extinguisher having a minimum rating of 20-B:C.

#### **4.3.7 Airport-welding apparatus.**

Welding apparatus shall be equipped with at least one listed fire extinguisher having a minimum rating of 2-A, 10-B:C.

#### **4.3.8 Airport-aircraft fuel-servicing vehicles ( Aircraft Refuelers).**

Aircraft fuel-servicing vehicles shall be equipped with at least two listed fire extinguishers, each having a minimum rating of 20-B:C. A fire extinguisher shall be readily accessible from either side of the vehicle.

**4.3.9 On hydrant fuel-servicing vehicles.** Hydrant fuel-servicing vehicles shall be equipped with a minimum of one listed portable fire extinguisher complying with Section 906, and having a minimum rating of 20-B:C.

#### **4.3.10 Aircraft motor vehicle fuel dispensing stations.**

Portable fire extinguishers at fuel-dispensing stations shall be located such that pumps and dispensers are not more than 75 feet from one such extinguisher. Fire extinguishers shall be provide as followed

1. When the open-hose discharge capacity of the fueling system is no more than 200 gallons per minute, at least two listed portable fire extinguishers having a minimum rating of 20-B:C shall be provided.
2. When the open-hose discharge capacity of the fueling system is more than 200 gallons per minute but not over 350 gallons per minute, at least one listed wheeled extinguisher having a minimum rating of 80-B:C and having a capacity of 125 pounds of agent, shall be provided.
3. When the open-hose discharge capacity of the fueling system is more than 350 gallons per minute, at least two listed wheeled extinguishers, having a minimum rating of 80-B:C each and having a capacity of 125 pounds of agent of each, shall be provided.

#### **4.3.11 Heliports.**

At least one fire extinguisher having a minimum 80-B:C rating shall be provided for each permanent take-off and landing area and for aircraft parking areas.

#### **4.3.12 Tents.**

Portable fire extinguishers and other fire-protection appliances shall be provided in every tent, canopy, and temporary membrane structure as follows:

1. 200-500 square feet of floor area: One 2-A:10-B:C rated portable fire extinguisher.  
501-1000 square feet of floor area: Two 2-A:10-B:C rated portable fire extinguisher.  
Each additional 2000 square feet of floor area or fraction there of: One 2-A:10-B:C rated portable fire extinguisher.
2. At least one 40-B:C rated portable fire extinguisher shall be provided for each kitchen, mess hall, power generator or transformer and at locations where flammable and combustible liquids are used, stored or dispensed, and as required by the code official.

#### **4.3.13 Automobile wrecking yards.**

Offices, storage buildings and vehicles used for site operations shall each be provided with at least one portable fire extinguisher with a rating of not less than 4-A, 40-B:C. When required by the code official, additional portable fire extinguishers shall be required in specific use areas.

#### **4.3.14 Magnesium.**

A supply of approved extinguishing materials in a substantial container with a hand scoop or shovel for applying material on magnesium fires or an approved portable fire extinguisher designed for use with such material shall be kept within easy reach of every operator performing a machining, grinding, or other processing operation on magnesium.

#### **4.3.15 Cutting and Welding-torch and flame producing devices.**

A minimum 2-A, 20-B:C-rated fire extinguisher or a charged water hose equipped with a nozzle shall be located within 30 feet of the location where hot works is in progress and shall be accessible without climbing stairs or ladders.

#### **4.3.16 LP-Gas and Open Flame Cooking.**

For compliance see Houston Fire Department LSB Standard 10, "LP-Gas Storage and Use".

## **APPENDIX – A**

### **CLASSIFICATION OF HAZARDS**

#### **Light Hazard.**

Light hazard occupancies are locations where the total amounts of Class A combustible materials, including furnishings, decorations, and contents, is of minor quantity. This classification anticipates that the majority of content items are either noncombustible or so arranged that a fire is not likely to spread rapidly. Small amounts of Class B flammables used for duplicating machines, art departments, etc., are included provided that they are kept in closed containers and safely stored.

#### **Ordinary Hazard.**

Ordinary hazard occupancies are locations where the total amount of Class A combustibles and Class B flammables are present in greater amounts than expected under light hazard occupancies. These occupancies could consist of dining areas, mercantile shops and allied storage, light manufacturing, research operations, auto showrooms, parking garages, workshop or support service areas of light hazard occupancies, and warehouses containing Class I or Class II commodities as defined by NFPA 231, “Standard for General Storage”.

#### **High hazard.**

High hazard occupancies are locations where the total amount of Class A combustible and Class B flammables present, in storage, production use, and/or finished product is over and above those expected and classed as ordinary hazards. These occupancies could consist of woodworking, vehicle repair, aircraft repair and boat servicing, cooking areas, individual product display showrooms, product convention center displays, and storage and manufacturing processes such as painting, dipping, coating, including flammable liquid handling. Also included is warehousing of or in-process storage of other Class I and Class II commodities.

## APPENDIX – B

### Class A Rated Fire Hazards

	<b>Light Hazard Occupancy</b>	<b>Ordinary Hazard Occupancy</b>	<b>High Hazard Occupancy</b>
Minimum rated Single Extinguisher	2-A <sup>c</sup>	2-A	4-A <sup>a</sup>
Maximum floor Area per Unit of A	3000 sq. ft.	1500 sq. ft.	1000 sq. ft.
Maximum floor Area for Extinguisher <sup>b</sup>	11,250 sq. ft.	11,250 sq. ft.	11,250 sq. ft.
Maximum travel Distance to Extinguisher	75 ft.	75 ft.	75 ft.

- a. Two 2 ½ gallon (9.46-L) water-type extinguishers can be used to fulfill the requirements of one 4-A rated extinguisher.
- b. Refer to NFPA 10, Appendix E-3-3 for more details concerning maximum floor area criteria.
- c. Two water-type extinguishers each with a 1-A rating shall be deemed the equivalent of one 2-A extinguisher for Light (Low) Hazard Occupancies, only where there are ordinary combustible materials and no electrical hazards exist.

## APPENDIX - C

### Class B Rated ( Flammable and Combustible Liquids) Fire Hazards

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers (feet)
Light (Low)	5-B	30
	10-B	50
Ordinary (Moderate)	10-B	30
	20-B	50
Extra (High)	40-B	30
	80-B	50

NOTE 1: The specified ratings do not imply that fires of magnitudes indicated by these ratings will occur, but rather to give the operators more time and agent to handle difficult spill fires that occur.

NOTE 2: For requirements on water-soluble flammable liquid and alternative sizing criteria, refer to NFPA 10, Sections 3-3 and 3-4.

## APPENDIX – D

### OCCUPANCY GROUP CLASSIFICATION

#### **4.2.1 Assembly Group A Occupancies:**

Group A Occupancies include, among others, the use of a building or structure, or a portion thereof, for the gathering together of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption; or awaiting transportation. A room or space used for assembly purposes by less than 50 persons and accessory to another occupancy shall be included as a part of that occupancy. Assembly occupancies shall include the following:

**Group A-1.** Assembly uses, usually with fixed seating, intended for the production and viewing of the performing arts or motion pictures including, but not limited to:

- Motion picture theaters
- Symphony and concert halls
- Television and radio studios admitting an audience
- Theaters

**Group A-2.** Assembly uses intended for food and /or drink consumption including, but not limited to:

- Banquet halls
- Night clubs
- Restaurants
- Taverns and bars

**Group A-3.** Assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A, including but not limited to:

- Amusement arcades
- Art galleries
- Bowling alleys
- Churches
- Community halls
- Courtrooms
- Dance halls (not including food or drink consumption)
- Exhibition halls
- Funeral parlors
- Gymnasiums (without spectator seating)
- Indoor swimming pools (without spectator seating)
- Indoor tennis courts (without spectator seating)
- Lecture halls
- Libraries
- Museums
- Passenger stations (waiting area)
- Pool and billiard parlors

**Group A-4.** Assembly uses intended for viewing of indoor sporting events and activities with spectator seating, including but not limited to:

- Arenas
- Skating rinks
- Swimming pools
- Tennis courts



**Group A-5.** Assembly uses intended for participation in or viewing outdoor activities with spectator seating, including but not limited to:

- Amusement park structures
- Bleachers
- Grandstands
- Stadiums

#### **4.2.2 Business Group B Occupancies:**

Business Group B occupancies include, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to the following:

- Airport traffic control towers
- Animal hospitals, kennels, pounds
- Assemblies with an occupant load less than 50
- Banks
- Barber and beauty shops
- Car wash
- Civic administration
- Clinic—outpatient
- Dry cleaning and laundries; pick-up and delivery stations and self-service
- Educational occupancies above the 12th grade
- Electronic data processing
- Fire and police stations
- Laboratories; testing and research
- Motor vehicle showrooms
- Post offices
- Print shops
- Professional services (architect, attorney, dentist, physician, engineer, etc.)
- Radio and television stations
- Telephone exchanges

#### **4.2.3 Educational Group E Occupancies:**

Educational Group E occupancies include, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

**Day care.** The use of a building or structure, or portion thereof, for educational, supervision or personal care services for more than five children older than 2 ½ years of age shall be classified as an E occupancy.

#### **4.2.4 Factory Industrial Group F Occupancies:**

Group F occupancies include, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous occupancy.

**Factory Industrial F-1 Moderate-Hazard Occupancy.** Factory Industrial uses which are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

- Aircraft
- Appliances
- Athletic equipment
- Automobiles and other motor vehicles

Bakeries  
Beverages over 12% in alcohol content  
Bicycles  
Boats; building  
Broom or brush  
Business machines  
Cameras and photo equipment  
Canvas or similar fabric  
Carpets and rugs (includes cleaning)  
Clothing  
Construction and agricultural machinery  
Disinfectants  
Dry cleaning and dyeing  
Electric light plants and power houses  
Electronics  
Engines (including rebuilding)  
Food processing  
Furniture  
Hemp products  
Jute products  
Laundries  
Leather products  
Machinery  
Metal  
Millwork (sash & door)  
Motion pictures and television filming  
Musical instruments  
Optical goods  
Paper mills or products  
Photographic film  
Plastic products  
Printing or publishing  
Recreational vehicles  
Refuse incineration  
Shoes  
Soaps and detergents  
Textiles  
Tobacco  
Trailers  
Upholstering  
Wood, distillation  
Woodworking (cabinet)

**Factory Industrial F-2 Low-Hazard Occupancy.** Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials which during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

Beverages up to and including 12% in alcoholic content  
Brick and masonry  
Ceramic products  
Foundries  
Glass products  
Gypsum

Ice  
Metal products (fabrication and assembly)

#### **4.2.5 Hazardous Group H Occupancies:**

Hazardous Group H occupancies include, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those found in of the *Building Code*. (See also definition of “Control Area”.)

**Exception:** Occupancies as provided for in the *Building Code* shall not be classified in Group H, but shall be classified in the occupancy which they most nearly resemble.

**Group H-1 structures.** Buildings and structures which contain materials that pose a detonation hazard, shall be classified as Group H-1. Such materials shall include, but not be limited to:

The following classifications of explosives;

Division 1.1

Division 1.2

Division 1.3

**Exception:** Materials that are used and maintained in a form where either confinement of configuration will not elevate the hazard shall be allowed in an H-2 Occupancy.

Division 1.5

Division 1.6

Organic peroxides, unclassified detonable

Oxidizers, Class 4

Unstable (reactive) materials, Class 3 detonable, and Class 4

Detonable pyrophoric materials

**Group H-2 structures.** Buildings and structures which contain materials that pose a deflagration hazard or a hazard from accelerated burning, shall be classified as Group H-2. Such materials shall include, but not be limited to:

Class I, II or IIIA flammable or combustible liquids which are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch (103.4 kPa) gauge.

Combustible dusts

Cryogenic liquids, flammable

Flammable gases

Organic peroxides, Class I

Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch (103.4 kPa) gauge.

Pyrophoric liquids, solids and gases, nondetonable

Unstable (reactive) materials, Class 3, nondetonable

Water-reactive materials, Class 3

**Group H-3 structures.** Buildings and structures which contain materials that readily support combustion or pose a physical hazard, shall be classified as Group H-3. Such materials shall include, but not be limited to:

Class I, II or IIIA flammable or combustible liquids which are used or stored in normally closed containers or systems pressurized at less than 15 pounds per square inch (103.4 kPa) gauge.

Combustible fibers

Cryogenic liquids, oxidizing

The following classifications of explosives:

Consumer fireworks, 1.4 G (Class C Common)  
Division 1.4 restricted to articles, including articles packaged for shipment that are not regulated as an explosive under Bureau of Alcohol, Tobacco and Firearms regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles.  
Flammable solids  
Organic peroxides, Class II and Class III  
Oxidizers, Class 2  
Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at less than 15 pounds per square inch (103.4 kPa) gauge.  
Oxidizing gases  
Unstable (reactive) materials, Class 2  
Water-reactive materials, Class 2

**Group H-4 structures.** Buildings and structures which contain materials that are health hazards, shall be classified as Group H-4. Such materials shall include, but not be limited to:

Corrosives  
Highly toxic materials  
Toxic materials

**Group H-5 structures.** Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials are used and the aggregate quantity of materials is in excess of those listed in the *Building Code*. Such facilities and areas shall be designed and constructed in accordance with the *Building Code*.

#### **4.2.6 Institutional Group I Occupancies:**

Institutional Group I occupancies include, among others, the use of a building or structure, or a portion thereof, in which people having physical limitations because of health or age are harbored for medical treatment or other care or treatment, or in which people are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

**Group I-1.** This occupancy shall include a building or part thereof housing more than 16 persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment but which provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff. This group shall include, but not be limited to, the following: residential board and care facilities, assisted living facilities, half-way houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug centers and convalescent facilities. A facility such as the above with five or less persons shall be classified as Group R-3 or shall comply with the *International Residential Code*. A facility such as above, housing at least six and not more than 16 persons shall be classified as Group R-4.

**Group I-2.** This occupancy shall include buildings and structures used for medical, surgical, psychiatric, nursing or custodial care on a 24-hour basis of more than five persons who are not capable of self-preservation. This group shall include, but not be limited to the following: hospitals, nursing homes (both intermediate care facilities and skilled nursing facilities), mental hospitals and detoxification facilities. A facility such as the above with five or less persons shall be classified as Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2.

**Child care facility.** A child care facility which provides care on a 24-hour basis to more than five children 2 ½ years of age or less shall be classified as Group I-2.

**Group I-3.** This occupancy shall include buildings and structures which are inhabited by more than five persons who are under restraint or security. An I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control. This group shall include, but not be limited to, the following: prisons, jails, reformatories, detention centers, correctional centers and prerelease centers. Buildings of Group I-3 shall be classified as one of the occupancy conditions indicated in the *Building Code*.

**Condition 1.** This occupancy condition shall include buildings in which free movement is allowed from sleeping units and other spaces where access or occupancy is permitted, to the exterior via means of egress without restraint. A Condition 1 facility is permitted to be constructed as Group R.

**Condition 2.** This occupancy condition shall include buildings in which free movement is allowed from sleeping units and any other occupied smoke compartment to one or more other smoke compartments. Egress to the exterior is impeded by locked exits.

**Condition 3.** This occupancy condition shall include buildings in which free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping units and group activity spaces, where egress is impeded by remote-controlled release of means of egress from such smoke compartment to another smoke compartment.

**Condition 4.** This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

**Condition 5.** This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

**Group I-4, day care facilities.** This group shall include buildings and structures occupied by persons of any age who receive custodial care for less than 24 hours by individuals other than parents or guardians, relatives by blood, marriage, or adoption, and in a place other than the home of the person cared for. A facility such as the above with five or fewer persons shall be classified as Group R-3 or shall comply with the *International Residential Code* in accordance with Section 101.2. Places of worship during religious functions are not included.

**Adult care facility.** A facility that provides accommodations for less than 24 hours for more than five unrelated adults and provides supervision and personal care services.

**Child care facility.** A facility that provides supervision and personal care on less than a 24-hour basis for more than five children 2 ½ years of age or less shall be classified as Group I-4 .

**Exception:** A child day care facility which provides care for more than five but no more than 100 children 2 ½ years or less of age, when the rooms where such children are cared for are located on the level of exit discharge and each of these child care rooms has an exit door directly to the exterior or the fire area is sprinklered, shall be classified as Group E.

**4.2.7 Mercantile Group M Occupancies.** Mercantile Group M occupancies include, among others, buildings and structures or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and accessible to the public. Mercantile occupancies shall include, but not be limited to, the following.

- Department stores
- Drug stores
- Markets
- Motor vehicle service stations, including oil changing facilities
- Retail or wholesale stores
- Sales rooms

**4.2.8 Residential Group R Occupancies.** Residential Group R occupancies include, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classed as an Institutional Group I. Residential occupancies shall include the following:

**Group R-1** Residential occupancies where the occupants are primarily transient in nature (less than 30 days) including:

- Boarding houses (transient)
- Hotels (transient)
- Motels ( transient)

**Group R-2** Residential occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:

- Apartment houses / Condominiums
- Boarding houses (not transient)
- Convents
- Dormitories
- Fraternities and sororities
- Hotels (not transient)
- Monasteries
- Motels ( not transient)
- Vacation timeshare properties

**Group R-3** Residential occupancies where the occupants are primarily permanent in nature and not classified as R-1, R-2 or I, and where buildings do not contain more than two dwelling units as applicable in Section 101.2 of the *International Residential Code*. Adult and child care facilities that are within single family home are permitted to comply with the *International Residence Code* in accordance with section 101.2.

**Group R-4** Residential occupancies shall include buildings arranged for occupancy as Residential Care/Assisted Living Facilities including more than five but not more than 16 occupants, excluding staff. Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3 except as other wise provided for in the Building Code or shall be in compliance with the *International Residential Code* in accordance with Section 101.2.

**4.2.9 Storage Group S Occupancies.** Storage Group S occupancies include, among others, the use of a building or structure, or a portion thereof, for storage that is not classed as a hazardous occupancy.

**Moderate-hazard storage, Group S-1.** Buildings occupied for storage uses which are not classified as Group S-2 including, but not limited to, storage of the following:

- Aerosols, Level 2 and Level 3
- Aircraft repair hangars
- Bags, cloth, burlap and paper
- Bamboos and rattan
- Baskets
- Belting, canvas and leather
- Books and paper in rolls or packs
- Boots and shoes
- Buttons, including cloth covered, pearl or bone
- Cardboard and cardboard boxes
- Clothing, woolen wearing apparel
- Cordage
- Furniture
- Furs
- Glue, mucilage, paste and size
- Grains
- Horn and combs, other than celluloid
- Leather
- Linoleum
- Lumber
- Motor vehicle repair garages (complying with the *Building Code* Section 406.6 and containing less than the maximum allowable quantities of hazardous materials)
- Petroleum warehouses for storage of lubricating oils with a flash point of 200° F (93° C) or higher
- Photo engraving
- Resilient flooring
- Silk
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstering and mattress
- Wax candles

**Low-hazard storage, Group S-2.** Includes, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products may have a negligible amount of plastic trim such as knobs, handles, or film wrapping. Storage uses include, but are not limited to, storage of the following:

- Aircraft hanger
- Asbestos
- Beverages up to and including 12-percent alcohol in metal, glass or ceramic containers
- Cement in bags
- Chalk and crayons
- Dairy products in nonwaxed coated paper containers
- Dry cell batteries
- Electrical coils

Electrical motors  
Empty cans  
Food products  
Foods in noncombustible containers  
Fresh fruits and vegetables in nonplastic trays or containers  
Frozen foods  
Glass  
Glass bottles, empty or filled with noncombustible liquids  
Gypsum board  
Inert pigments  
Ivory  
Meats  
Metal cabinets  
Metal desks with plastic tops and trim  
Metal parts  
Metals  
Mirrors  
Oil-filled and other types of distribution transformers  
Parking garages (open or enclosed)  
Porcelain and pottery  
Stoves  
Talc and soapstone  
Washers and dryers

**4.2.10 Miscellaneous Group U Structures.** Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:

Agricultural buildings  
Aircraft hangar, accessory to a one- or two-family residence (see *Building Code*, Section 412.3)  
Barns  
Carports  
Fences  
Grain silos, accessory to a residential occupancy  
Greenhouses  
Livestock shelters  
Private garages  
Retaining walls  
Sheds  
Stables  
Tanks  
Towers



## REFERENCES

1. City of Houston *Fire Code*, International Fire Code, 2000 edition, as amended.
2. City of Houston *Building Code*, International Building Code, 2000 edition, as amended.
3. National Fire Protection Association (NFPA) Standard 10, “Portable Fire Extinguishers”.
4. National Fire Protection Association (NFPA) Standard 231, “Standard for General Storage”.
5. HFD LSB Standard 02, “Inspection and Testing of Fire Protection and Life-safety Equipment”.
6. HFD LSB Standard 10, “LP-Gas Storage and Use”.
7. HFD LSB Standard 11, “Roofing Operations”.

Conversion factors: 1 inch = 25mm; 1 foot = 305 mm  
1 gallon (US) = 3.8 Liters  
1 pound = 0.5 Kilograms